(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 January 2005 (20.01.2005)

PCT

(10) International Publication Number
WO 2005/005965 A1

(51) International Patent Classification[7]: G01N 15/14

(21) International Application Number:
PCT/IL2004/000616

(22) International Filing Date: 8 July 2004 (08.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
156856 9 July 2003 (09.07.2003) IL

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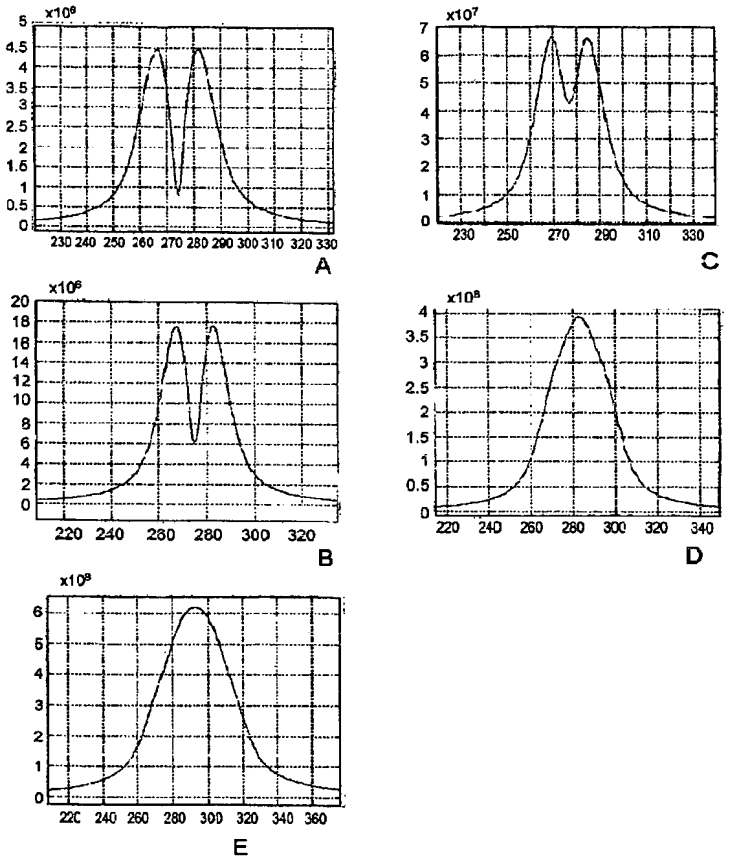
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH,

[Continued on next page]

(54) Title: A METHOD FOR PARTICLE SIZE AND CONCENTRATION MEASUREMENT



(57) Abstract: The present invention provides method of particle size and concentration measurement that comprises the steps of: providing a focused, synthesized, non-Gaussian laser beam, causing the beam to interact with the particles, measuring the interaction signal and the number of interactions per unit time of the beam with the particles, and using algorithms to map the interaction signals to the particle size and the number of interactions per unit time to the concentration. The particles are fluid borne, airborne, or on a surface and have a size ranging from sub-micron to thousands of microns. In a preferred embodiment of the invention, the focused, synthesized, non-Gaussian laser beam is a dark beam. The non-Gaussian beam can be generated by employing a mask over a Gaussian laser beam or by directly modifying the laser cavity or by combining the beams from several lasers. The measurements can be made using the duration of interaction with a scanning beam, including dark field. The invention further provides a system for particle size and concentration measurement.

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GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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